INSIGHT, PSYCHOPATHOLOGY AND EXECUTIVE FUNCTION IN INPATIENTS WITH SCHIZOPHRENIA

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CERTIFICATE

This is to certify that the dissertation titled, **"INSIGHT, PSYCHOPATHOLOGY AND EXECUTIVE FUNCTION IN INPATIENTS WITH SCHIZOPHRENIA"**, submitted by **Dr. Sharon Joe Daniel,** in partial fulfillment for the award of the **MD degree in Psychiatry** by the Tamil Nadu Dr. M. G. R. Medical University, Chennai, is a bonafide record of the work done by him in the Institute of Mental Health , Madras Medical College during the academic years 2005 – 2008

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INTRODUCTION

Insight is defined in the Webster's dictionary as 'the understanding or awareness of one's mental or emotional condition; especially, a recognition that one is mentally ill'.

Insight is an elusive concept with a long history of divergent and inconsistent definitions and measurements (Amador & David, 1998).

Until the early nineteenth century, the official view of insanity was based on the presence of delusions which were, in turn, embedded in an implicit lack of insight. Lack of insight was thus not a variable but a parameter of insight (Amador and David, 2004).

The developments of concepts such as partial, emotional and volitional insanity during the second half of the nineteenth century led to the examination of the value of evaluating the attitude of patients vis a vis their insanity (Markova and Berrios, 2004).

The term "anosognosia" was first used by the French neurologist Babinski to describe denial of motor deficits in neurological disease.

Traditional views of insight considered it to be a single homogenous entity which was non reducible and hence rated as a single item however interest in this area has been revived by many current authors who have proposed new models to understand and explain insight.

Interest in studying insight is also fueled by an increasing desire to elucidate the correlates of insight and its causal origins. This desire is strengthened by studies which point to a key role of insight in mediating treatment compliance and outcome.

Research into insight is also influenced by current theories of schizophrenia which consider enduring neurocognitive deficits due to brain dysfunction as being a core component of the disorder.

However despite being the focus of intensive research in the past decade, though much progress has been made in the measurement of insight, the foundations of impaired insight are still remain elusive. Studies focusing on the relation between neuropsychological deficits and insight are often contradictory and hampered by methodological, operational and consistency problems.

REVIEW OF LITERATURE

In 1934, Aubrey Lewis provided a temporary definition of Insight: “a correct attitude to morbid change in oneself”, but warned that the words ‘correct’, ‘attitude’, ‘morbid’ and ‘change’ each called for discussion (Lewis, 1934).

Current authors agree that insight is multidimensional and not a unitary phenomenon. The component dimensions of insight are continuous rather than dichotomous phenomena (Amador et al, 1993).

Insight into one’s own psychosis is not an ‘all or- none’ phenomenon but can be conceived of as a multidimensional construct and is composed of three distinct, overlapping dimensions, namely, recognition that one has a mental illness, compliance with treatment, and ability to re-label unusual mental events (delusions and hallucinations) as pathological (David, 1990).

Patients with schizophrenia have multiple deficits in self-awareness and that this unawareness can be modality specific, i.e., one can have poor awareness of thought disorder but recognize that he or she suffers from false perceptions (Amador et al, 1994).

Insight comprises process of awareness and attribution. Awareness is the recognition of signs (or) symptoms of illness, while attribution refers to explanations about the cause source of the signs (or) symptom. Insight assessment also includes retrospective views about illness (Amador et al, 1993).

This understanding of a multi dimensional model of insight has given rise to scales like the Scale to assess Unawareness of Mental Disorders (SUMD) which are more comprehensive measures of insight (Amador and Strauss, 1990).

There is also an increasing interest in understanding lack of insight in schizophrenia as an 'anosognosia' (Laroi et al, 2004)

Models of Insight

Despite progress in defining and measuring insight, the nature of unawareness of illness in patients with schizophrenia remains poorly understood (Freudenreich et al, 2004). The more recent, empirical literature points in several directions.

First, insight might simply be part and parcel of schizophrenia, a symptom that cannot be further reduced (Cuesta and Peralta 1994a).

Secondly, lack of insight could stem from a neurological deficit akin to anosognosia. (Amador et al 1991)

Thirdly, affective experiences, such as euphoria (Ghaemi et al, 1995), depression or anxiety (Michalakeas et al, 1994; Smith et al 2000) may play a role in insight.

Lastly, it has been suggested but not tested empirically that insight or lack of insight is a function of social labeling (Johnson & Orrell 1995).

David & Kemp, consider two factors to be most important in the genesis of insight, first, that insight is an aspect of psychopathology, particularly delusions, and second that poor insight reflects a neuropsychological deficit (David & Kemp 1998).

Amador et al, (1991), give two main broad accounts of variations in insight that might be called motivational and defect theories. The former assumes that individuals are aware of their illness in some sense but are motivated to deceive themselves (or others) about it in order to preserve their self-esteem, maintain an optimistic outlook, or some similar reason. Defect theories, on the other hand, assume that schizophrenic individuals are unable to recognize their illness as a result of some cognitive deficits.

In the last few years there has been a definite shift in the literature away from the 'psychology' of poor insight and toward the identification of possible neuropsychological substrates (Takai et al., 1992; David et al., 1993; Collins et al, 1997).

Anosognosia and Insight

Poor insight in schizophrenia shares common features with anosognosia in neurological disorders such that both are largely resistant to direct confrontation and delusional explanations are often provided to explain circumstances such as hospitalizations (Cuesta and Peralta, 1994a). Lele and Joglekar (1998) have carried the analogy further, pointing out that both anosognosia and poor insight in schizophrenia can be either generalized (relating to all aspects of the disease) or domain-specific (patient is aware of certain symptoms or functional deficits, but not others).

There is evidence that poor insight in Alzheimer's disease is associated with lower regional cerebral blood flow in the right frontal lobe (Starkstein and Vazquez, 1995), as well as with severity of cognitive impairments (Migliorelli,

et al., 1995) and specific deficits in frontal/executive functions (Lopez et al., 1994).

Frontal and pre-frontal areas of the cortex have become increasingly implicated as primary areas of dysfunction in schizophrenia. Findings from neuropsychology, neuroradiology, and neurophysiology have largely converged in this regard (Seidman, 1993; Weinberger et al,, 1992).

Importance of Insight

Previous studies have estimated that 50–80% of patients with schizophrenia do not believe they have a disorder (Amador and Gorman, 1998). Thus lack of insight is a common problem in schizophrenia

Lack of insight or awareness of illness has been widely recognized as a clinically relevant outcome measure (Amador and Gorman, 1998). This is primarily due to an association between impaired insight and treatment non-adherence (McEvoy et al, 1989; David et al, 1992; Perkins, 2002), poor psychosocial functioning (Dickerson et al, 1997; Amador et al., 1994), premorbid functional impairment (Debowska et al, 1998; Keshavan et al, 2004), poorer global functioning (Pini et al, 2001), poor prognosis (Schwartz et al., 1997), involuntary hospitalizations (Kelly et al., 2004), greater violence (Buckley et al, 2004) and higher utilization of emergency services (Haro et al, 2001).

Insight in Schizophrenia

Early clinical descriptions of schizophrenia identified lack of insight as a characteristic symptom of the illness (Lewis A, 1934). Schizophrenic patients

demonstrate comparably less insight than either schizoaffective or depressive patients (Amador et al., 1994; Michalakeas et al., 1994; Pini et al., 2001).

Poor insight or denial of illness is a prevalent feature of schizophrenia (Carpenter et al., 1978; Wilson et al, 1986). Poor insight can be conceptualized as an expression of the disorder, much as hallucinations or delusions, and is noted to be an important discriminating factor in making subtype diagnoses of schizophrenia (Carpenter et al., 1976).

Correlates of Insight

In accordance with the multiple models of origin of poor insight in schizophrenia, insight is considered to have multiple correlates. They may be broadly grouped as clinical, psychopathological and neuropsychological correlates

Insight and Social Variables

Poor insight has been associated with female gender (Peralta and Cuesta, 1998). This is contradicted by other studies (Keshavan et al, 2004; Mintz et al, 2003) which do not find such an association.

In a study by Sanz et al, in 1998, number of years of education showed a modest correlation with the score in Markova & Berrios Insight Scale. But none of the other insight scales showed a significant relationship between insight and years of education. In their study on 535 patients with first episode schizophrenia, Keshavan et al, (2004) found no evidence of a relation between education and both insight and cognition.

Thus overall findings suggest that the relationship between insight and socio demographic variables is small and not consistent.

Insight and Clinical Variables

Nakano et al, (2004) suggest a relation between poor insight and younger age. Similarly, Mintz et al, in a Meta-analytic review in 2003, had suggested a moderator effect of mean age of onset on insight. However other studies do not agree with this (Keshavan et al, 2004; Amador et al, 1994).

Left handedness was linked to poor insight in a study by David in 1995. However there are no corroborative reports.

Thompson et al, in 2001, demonstrated that compared to first-episode patients, individuals who had experienced multi-episodes of schizophrenia, showed greater awareness of having a mental disorder. However in an earlier study, Amador et al, had found that the number and duration of hospitalizations were not significantly correlated with insight (Amador et al, 1994). Prolonged illness duration has also been associated with poorer insight (Drake et al, 2000).

Insight and Psychopathology

The studies examining the connection between insight and schizophrenic phenomenology have been hampered by varying definitions and measurements of insight and outcome, lack of structured assessments and standardized instruments as well as varying diagnostic practices (Kemp and Lambert, 1995).

Varying results have been reported about the relationship between lack of insight and global psychopathology. Some studies have found negative associations (David et al, 1992; Markova and Berrios, 1992b; Young et al, 1993; Mintz et al, 2003) implying that insight becomes less with greater severity of psychosis but not others (McEvoy et al, 1989; Cuesta and Peralta, 1994a),

The majority of investigations that have assessed insight and positive symptoms have reported a moderate but statistically significant inverse relationship between the two variables (David et al, 1992; Takai et al, 1992; Markova and Berrios, 1992b; Amador et al, 1994; Michalakeas et al, 1994; Young et al, 1993; Kemp and Lambert, 1995).

However there has also been suggestion that these two variables are actually independent of one another (Bartko et al, 1988; McEvoy et al, 1989 & 1993; Heinrichs et al, 1985; Cuesta and Peralta, 1994b) and severity of positive psychotic symptoms does not influence insight.

A meta-analysis on this area by Mintz et al, in 2003 of 40 published studies indicated a small positive relationship between lack of insight and positive symptoms. They also concluded that acute patient status moderated the relationship between insight and symptom clusters, meaning that during acute episodes, the relationship between insight and positive symptoms is stronger.

In addition, specific symptoms like delusions (Kemp and Lambert, 1995; Amador et al, 1994) and formal thought disorder (Lysaker et al, 1994b; Amador et al, 1994) have also been linked to insight deficits.

Impaired insight has also been associated with disorganized symptoms (Dickerson et al, 1996; Kim et al, 1997; Collins et al, 1997; Amador et al, 1994). This association of disorganization and lack of insight is considered by some to be stronger than that with positive symptoms (Amador et al, 1994).

Negative symptoms also are associated with poorer insight (Mintz et al, 2003; Nakano et al, 2004; Kemp and Lambert, 1995). Some studies however suggest that the strength of this association is weaker than that for positive symptoms (Collins et al, 1997; Carroll et al, 1999). Amador et al, (1994) however suggest that there is no relationship between insight and negative symptoms except anhedonia.

Similar mechanisms may underlie poor insight and negative symptoms in schizophrenia (Stolar et al, 1994; Hammer et al, 1995) since it has been argued that they both share the same neurological substrates in the brain

Insight and Depression

Insight has also been associated with depression in many studies (Peralta and Cuesta, 1994b; Kemp and Lambert, 1995; Moore et al, 1999; Morgan et al, 2002; Mintz et al, 2003). Such findings have added weight to the motivational theories of insight, and lack of insight is viewed as a method of warding off depressive symptoms that may result from the awareness that one suffers from a chronic illness. Good insight is also linked in studies to both hopelessness and greater life time suicidal attempts (Kim CH et al, 2003) and to pessimism (Thompson, 1988). Amador et al, (1993), however, reported that higher levels of depression were associated with poor insight.

Neuropsychological Deficits and Schizophrenia

It is now beyond question that the symptoms observed in schizophrenia include a range of cognitive neuropsychological deficits that may be more enduring than psychotic symptoms (Goldberg et al, 1993).

Clearly an understanding of neuropsychological deficits is important from a clinical as well as a theoretical viewpoint. There is, however, still much debate about the nature of these deficits and how they relate to the psychotic symptoms of schizophrenia and also to the neurobiological substrate of this disorder. (Elliot et al, 1995)

There is evidence for generalized intellectual decline associated with schizophrenia (Saykin et al, 1994) and it has also been argued that specific neuropsychological deficits may occur over and above this general impairment (Weimberger et al, 1986).

Insight and Neuropsychology

Neuropsychological theories of the etiology of poor insight in schizophrenia have suggested that unawareness of illness is, at least in part, the result of prominent and enduring neurocognitive impairments. Support for this hypothesis comes from several different sources. First, poor insight shares many clinical features in common with anosognosia (Amador, 1991), or unawareness of illness in neurological disorders. Secondly, factor analytical studies have consistently found that insight belongs to a psychopathological component composed primarily of symptoms of cognitive impairment (Bell et al, 1993; Kay et al, 1990). Finally, more recent studies have demonstrated that

poor insight predicts poorer performance on neuropsychological testing (Young et al, 1993; Lysaker et al, 1994a), and is possibly related to ventricular enlargement (Takai A et al, 1992).

The neuropsychological view of insight is that awareness of illness and relabelling of symptoms may be higher order cognitive abilities. In particular, it is conceivable that these components of poor insight are primarily the result of (i) global cognitive compromise, (ii) impairments in executive function or (iii) a combination of various forms of cognitive impairment (Lysaker et al, 1998).

Significant cognitive impairment across multiple domains is a core characteristic of schizophrenia.

Frontal Lobe and Schizophrenia

Many of the earliest theorists, Bleuler, Meynert, Kraepelin and Alzheimer, argued that the symptoms of schizophrenia may be related to the dysfunction of the frontal lobes, and this contention has now been resurrected (Robbins, 1990; Jaskiw & Weinberger, 1992). Weinberger (1988) noted that there is an intuitive plausibility that the brain area most associated with conscious thought should be compromised in a disease characterized by formal thought disorder. He also describes that there are neurological signs in schizophrenia that are reminiscent of those following frontal lobe damage (disturbed gait, posture and eye movements).

Several authors (Flashman et al, 2004; Cuesta et al, 1995) have linked negative symptom pathology to decreasing performance on cognitive tests, particularly those that demonstrate frontal lobe function. Brown and White

(1991) also reported that patients with a higher rating of negative symptoms were found to have more impaired performance on frontal psychological tests.

The Wisconsin Card Sorting Test (WCST) is the most widely used test of frontal and executive function. The scores on categories achieved and perseverative errors are most relevant in assessing frontal executive function (David et al, 2003)

Frontal lobe and Executive Function

Neurosurgical patients with damage to the frontal lobes and particularly the prefrontal cortex show significant impairments in executive functioning so that tests sensitive to frontal lobe dysfunction and tests of executive function tend to be considered as synonymous (Shallice, 1982; Owen et al, 1990)

Impairments in tests of executive function have frequently been reported in neurosurgical patients with frontal lobe damage (e.g. Shallice, 1982; Owen et al, 1990) and the impairments of schizophrenics on executive tests described above are thus consistent with a theory of frontal lobe dysfunction.

Frontal lobe and Insight

The various studies that have demonstrated the poor performance of insight-impaired schizophrenia patients on tasks that require frontal lobe activation (Keshavan et al, 2004; Lele et al, 1998; Young et al, 1993) add evidence to the hypothesis that frontal lobe deficits are an important part of declining insight

Flashman et al, (2001), tested insight in schizophrenia patients as a function of neuroanatomic abnormalities in the frontal lobe. Their results showed an inverse correlation between unawareness and volumes of different frontal regions.

Studies by Lysaker & Bell (1994a) found significant, yet small, correlations between insight and measures sensitive to frontal lobe dysfunction, However, Cuesta and Peralta (1994a) failed to replicate these results.

Insight and Executive Function

Some authors have found that executive function tasks such as the Wisconsin Card Sorting Test administered to individuals with poor insight show increased preservative responses and/or poor concept formation (Young et al, 1998; Lysaker & Bell, 1994a; Lysaker et al. 1998; Larøi et al. 2000). Individual components of insight have also been related to poor scores on executive function and fluency tests; a significant association was found between unawareness of symptoms and misattribution of negative symptoms and scores on such tests (Mohamed et al. 1999). Smith et al, (2000) reported that overall insight levels were not related to neuropsychological variables but more specifically, symptom misattribution was correlated with card sorting performance. However, several studies have failed to demonstrate that poor insight is related to neuropsychological deficits, including card sorting (Cuesta & Peralta, 1994a; Collins et al, 1997; Goldberg et al, 2001). Thus there is as yet no conclusive evidence to link impaired insight to cognitive deficits.

Lists of studies providing evidence for and against a neurocognitive basis for insight are tabulated below.

Positive	Negative
Young et al, (1993),	Cuesta et al, (1995),
McEvoy et al, (1996),	Kemp and David (1996),
Young et al, (1998),	Collins et al, (1997),
Mohammed et al, (1999),	Dickerson et al, (1997),
Laroi et al, (2000),	Sanz et al, (1998),
Chen et al, (2001),	Arduini et al, (2003),
Lysaker et al, (2002),	Kim et al, (2003),
Drake and Lewis (2002),	Freudenreich et al, (2004)
Keshavan et al, (2004),	
Shad et al, (2004),	
Shad et al., (2006),	
Aleman et al, (2006).	

Thus despite extensive research about insight in the past decade, the results are far from conclusive and the origins of insight deficits remain elusive as ever. Some of the factors identified as being associated with insight include, severity of psychosis, depression, neurocognitive deficits especially those with their basis in the frontal lobe. Research in this area in India is not fully explored especially with reference to the cognitive basis of insight.

AIMS

1. To determine the extent of insight deficits in schizophrenic inpatients

2. To determine the sociodemographic and clinical correlates of insight in schizophrenia

3. To examine the relation between depression and insight

4. To examine the relation between severity of psychotic symptoms and insight

5. To determine the relation between insight and executive function in inpatients with schizophrenia.

Null Hypothesis

1. Insight is not correlated with socio demographic variables
2. Insight is not correlated with clinical variables
3. There is no association between Insight and depression
4. Insight is not correlated with the severity of either positive or negative symptoms
5. Insight is not associated with executive dysfunction in schizophrenia

Materials

1. A semi structured proforma for sociodemographic profile and relevant clinical data.
2. Scale to assess Unawareness of Mental Disorder (SUMD)
3. Scale for the Assessment of Positive Symptoms (SAPS)
4. Scale for the Assessment of Negative Symptoms (SANS)
5. Items G 12 (Lack of judgment and Insight) and G 2,3,4 & 6 - (Depression - Anxiety domain) in Positive and Negative Syndrome Scale (PANSS)
6. Wisconsin Card Sorting Test (WCST)

METHODOLOGY

The study was of a cross sectional nature done on a sample schizophrenic in patients admitted in the acute care wards of IMH Chennai for either an exacerbation of illness or an initial episode. Both male and female patients were chosen in equal number (30 each). Consecutive male and female patients with a diagnosis of schizophrenia admitted in the institute and fulfilling the criteria were chosen. The diagnosis of schizophrenia was made as per ICD 10 clinical criteria, independently by two persons, a senior psychiatrist and the investigator.

Inclusion Criteria:

- ICD 10 diagnosis of schizophrenia
- Age between 18 and 40 years
- Consent and cooperation for examination
- Onset of illness after age 18 years
- Informant available for detailed history

Exclusion Criteria:

- Age less than 18 years and greater than 40 years.
- Patients who did not complete the evaluation
- Onset of illness before 18 years
- Comorbid organic illnesses
- Comorbid substance dependence
- Other comorbid Axis I diagnosis, excluding depression

Onset age less than 18 years was excluded to prevent inclusion of early onset schizophrenia that have high levels of cognitive dysfunction and hence could potentially confound the results. Similarly, patients aged greater than 40 years were excluded so as to minimize the chances of age and illness chronicity influencing executive function scores. Comorbid substance dependence, Axis I disorders and organic illnesses were excluded for the same reason. Depression could not be excluded as it is considered as one of the variables influencing in insight. Informed and written consent was obtained.

The interviews and assessments were done during the hospital stay of the patient prior to discharge. All assessments were done by the investigator. The assessment of psychopathology and insight was done before administration of the WCST so as to minimize interviewer bias.

A single cross sectional assessment was done in which, all tests were administered preferably in a single sitting or within a few days of each other so as to maintain the cross sectional nature of the assessment. The study was naturalistic with regard to treatment adopted either in the past or in the current admission.

INSIGHT ASSESSMENT

Scale to assess Unawareness of Mental Disorder (SUMD)

The Scale to assess Unawareness of Mental Disorder (SUMD) (Amador and Strauss, 1990) is a semi-structured interview and scale that was designed to evaluate the multidimensional nature of insight. Scores are rated on a five-point scale (1=complete awareness, 3= partial awareness and 5=no awareness). The

scale is modular and can be shortened or adapted in a number of ways. SUMD sub-scores consist of the three General items (unawareness of a mental disorder, unawareness of the achieved effects of medication and the unawareness of the social consequences of a mental disorder) and Unawareness and Misattribution sub scores of each major symptom (consisting of questions relating to awareness and attribution of the specific symptoms). The average of all items rated is used as the awareness and misattribution score. Some of the symptoms examined include delusions, hallucinations Alogia etc. In addition, the SUMD allows for independent assessment of current and retrospective insight. For the purpose of the present research, analysis was primarily focused on current items since the sample included patients with first episode schizophrenia. (Annexure V)

Positive and Negative Syndrome Scale (PANSS)

Insight was also assessed using the insight and judgment item (G 12) from the Positive and Negative Syndrome Scale (PANSS) (Kay SR et al, 1987) since most of the earlier studies in this area have used this single item measure. It incorporates the three dimensions of insight into one global rating, and has been found to possess a high degree of concordance with the total score from another widely accepted measure of insight, namely the Scale to Assess Unawareness of Mental Disorder (SUMD) (Annexure II)

CLINICAL ASSESSMENT

Scale for the Assessment of Positive Symptoms (SAPS)

The Scale for the Assessment of Positive Symptoms (SAPS) (Andreasen N, 1984) is a 34 item scale for use in schizophrenia. It is administered via a general clinical interview with some specific questions. All items are rated from 0 (absent) to 5 (Severe). Ratings from SAPS are divided into two symptom dimensions which include Psychoticism (delusions and hallucinations) and Disorganization (bizarre behavior, formal thought disorder and inappropriate affect). The SAPS is a well validated instrument and is widely used. (Annexure III).

The Scale for the Assessment of Negative Symptoms (SANS)

The Scale for the Assessment of Negative Symptoms (SANS) (Andreasen N, 1981) is a 25 item scale designed to assess negative symptoms in schizophrenia. The symptoms measured are alogia, affective flattening, avolition-apathy, anhedonia-asociality and inattention. The SANS is a popular and well validated and used both clinically and in research. (Annexure IV).

Depression

The depression-anxiety domain (items G2, G3, G4 & G6) in PANSS (Kay SR et al, 1987) was used to measure depression. The mean score on the four items was taken as the score on depression. The scores ranged on a likert scale from 1 = absent to 7 = extreme depression. Individual items and domains of the PANSS have been shown to be of good validity (Annexure II).

EXECUTIVE FUNCTION

Wisconsin Card Sorting Test (WCST)

The Wisconsin Card Sorting Test (WCST) (Heaton HK, 1981) is a neuropsychological test in which subjects sort cards that vary according to shape, color and the number of objects depicted. Subjects are told to match the cards to 'stimulus' cards but are not told the matching principle which changes after 10 consecutive correct responses. This study utilized five scores namely total errors, perseverative errors, perseverative responses, conceptual level responses and categories correct. The WCST is considered as the gold standard in the assessment of executive function with relative specificity for the frontal lobe. Studies which use the WCST in populations with cognitive dysfunction use the raw scores obtained rather than the standardized scores. This makes it applicable for the Indian population as well. The WCST is a non verbal test and can be used in a variety of settings. (Annexure VI).

ANALYSIS

The data collected was tabulated and analyzed with reference to the aims and objectives of the study. All statistical analysis was done using Statistical Package for Social Sciences (SPSS ver. 15. 0). A correlational analysis was used to assess the relation between the insight scores in different domains of the SUMD and continuous variables using Pearson’s correlation. The t - test was used to study the relation between insight and categorical variables. Multiple regression analysis was done to determine the independent effects of significant variables on insight. The level of significance was kept at $p < 0.05$.

RESULTS

Assessment of insight and psychopathology was done on 60 patients. Since 4 of these patients (3 male, 1 female), could not be assessed for executive function (WCST) as they were discharged or absconded from the ward before they could be assessed, 4 more patients (3 male and 1 female) were assessed consecutively at the end so that the final sample taken for analysis was 60 patients (30 male and 30 female) as per the study criteria.

Table 1a

Description of Social and Clinical Characteristics

Variable	Mean (n = 60)	SD
Age	29.3	5.85
Education in years	8.8	3.51
Age at onset	25.15	4.88
Duration of Illness	4.17	2.94
No. of Admissions	1.75	1.16

SD – Standard Deviation

The mean age of the study sample was 29. 3 years. The sample was selected to be in the age range of 18 to 40 hence the standard deviation is not high. Most patients had some form of schooling with the average years of schooling being 8.8 years. Few patients had graduated. The mean age at onset was 25.1 years. Mean duration of illness was 4.17 years. The mean number of admissions was 1.75. The number of patients in the sample who were admitted for the first time was 35.

Table 1b

Description of Social Characteristics

Variable	Group	Frequency	Percentage
Sex	Female	30	50
	Male	30	50
Marital Status	Unmarried	29	48.33
	Married	26	43.33
	Separated	5	8.33
Religion	Hindu	52	86.67
	Christian	4	6.67
	Muslim	4	6.67
Occupation	Unemployed	34	56.67
	Employed	26	43.33
Region	Rural	36	60.00
	Urban	24	40.00
Income	< 1000	35	58.33
	1000 – 3000	24	40.00
	> 3000	1	1.67

Equal number of males and females were chosen for the study. Almost half of the sample was married. Four of the 5 maritally separated patients were women. About half the present sample (43.33 %) had been employed in some work prior to the illness. A majority (60 %) of the sample was derived from rural areas. Almost the entire sample was derived from the lower income population.

Table 1c

Description of Clinical Characteristics of the Sample

Variable	Sub Group	Frequency	Percentage
Schizophrenia Type	Paranoid	38	63.33
	Undifferentiated	12	20.00
	Catatonic	1	1.67
	Residual	3	5.00
	Disorganized	6	10.00
Number of Episodes	First	45	75
	Other	15	25
Duration Untreated	< 1 Month	8	13.33
	1 – 6 Month	10	16.67
	6 Months – 1 Year	13	21.67
	1 – 2 Years	15	25.00
	> 2 Years	14	23.33
Family History	Positive	33	55.0
	Negative	27	45.0
Handedness	Right	60	100.0
	Left	0	0
ECT	Given	12	20
	Not Given	48	80
Treatment	Atypicals	57	95
	Typicals	3	5

The majority of the sample had paranoid schizophrenia (63.3%). The proportion of patients who were having the first episode of illness was 45% and who had a positive family history was 55%. Most patients were treated with atypicals only (95%). There were no left handed people in the sample. 12 patients had been administered ECT.

Table 2a

Description of Insight Scores in Different Domains by Mean (n = 60)

Unawareness of	Range	Mean	SD
Mental Illness	1 – 5	3.78	1.28
Effects of Treatment	1 – 5	3.55	1.35
Social Consequences	1 – 5	4.12	1.14
Specific Symptoms	1 – 5	3.98	0.91
Attribution of Symptoms	1 – 5	4.02	0.99
PANSS G12	1 – 7	4.52	1.53

PANSS G12- Insight score on PANSS insight item. SD- standard deviation.

Insight was assessed by two measures, the SUMD and the Insight item of PANSS. The average scores of unawareness were high on all sub scales of SUMD and the PANSS item. The mean score was lowest for unawareness of the effect of treatment (3.55) and highest for unawareness of social consequences (4.12). This difference between the insight scores of various dimensions of the SUMD was significant (the coefficient of concordance – Kendall's W = 0.099; $\chi^2 = 17.83$; asymp. Sig = 0.001).

Table 2b

Description of Insight Scores in Different Domains of SUMD by Frequency

Score	SUMD 1C	SUMD 2C	SUMD 3C	SUMD Aware.	SUMD Attrib.
	frequency	frequency	frequency	frequency	frequency
0 – 1	3	6	2	0	0
1 – 2	8	8	3	2	1
2 - 3	14	13	14	4	12
3 - 4	9	13	8	17	19
4 – 5	26	20	33	37	28
Total	60	60	60	60	60

SUMD 1C-Awareness of mental illness; SUMD 2C- Awareness of treatment benefit; SUMD 3C- Awareness of social dysfunction; SUMD Aware- average awareness score of all symptoms; SUMD Attrib - average attribution score of all symptoms; PANSS G12- insight score on PANSS insight item. SD- standard deviation

The table gives an indication of the frequency of scores in each insight domain. As indicated by the previous table, many patients had a high level of unawareness and scored 5 for unawareness of symptoms on SUMD indicating a complete lack of insight. Since the level of insight was almost uniformly poor, rather than dividing the sample into two groups based on insight scores and comparing them, a correlation analysis was done between insight scores and relevant factors.

Table 3

Description of Psychopathology and Depression Scores

Psychopathology	Range	Mean (n = 60)	SD
Psychoticism	0 – 5	2.46	0.91
Disorganization	0 – 5	2.29	0.94
Negative Symptoms	0 – 5	2.03	0.97
Depression	1 – 7	2.40	1.58

SD – Standard Deviation

The mean score on the Psychoticism domain of SAPS was 2.46 with a standard deviation of 0.91. The mean score on the disorganization domain of the SAPS was 2.29 with a standard deviation of 0.94. The average negative symptom score on SANS was 2.03 with a standard deviation of 0.97. The mean score on the depression-anxiety domain of the PANSS was 2.4 with a standard deviation of 1.58.

Table 4

Description of Wisconsin Card Sorting Test (WCST) Performance

WCST Score	Mean (n = 60)	SD
Percent Errors (% Error)	64.75	16.00
Perseverative Responses (PR)	50.58	12.50
Perseverative Errors (PE)	44.30	20.47
Non Perseverative Errors (NPE)	20.37	9.89
Conceptual Responses (CLR)	40.52	15.00
Categories Completed (CC)	1.93	1.13
Trials for 1st Category (n = 56)	28.70	14.11

SD – Standard Deviation

The average number of categories completed on the WCST was 1.93. No patient was able to complete all 6 categories and 4 patients did not complete even one category. The mean scores on each performance item of WCST were calculated. The average number of errors was 64.75 with a standard deviation of 16. The mean number of perseverative responses was 50.58 and the mean perseverative error score was 44.30. The average number of non perseverative errors was 20.37. The proportion of perseverative errors was thus greater than that of non perseverative errors. The average number of conceptual responses was 40.52. The average number of trials taken to complete the first category was 28.70.

Table 5a

Correlation Coefficients of Insight scores and Continuous Social and Clinical Variables (Pearson's Correlation) (n = 60).

Unawareness of	Age r (p)	Education r (p)	Onset Age r (p)	Duration of Illness r (p)	No. of Admissions r (p)
Mental Illness	- 0.043 (0.742)	0.059 (0.654)	- 0.095 (0.469)	0.058 (o.657)	0.095 (0.473)
Effects of Treatment	- 0.028 (0.833)	- 0.088 (0.506)	- 0.075 (0.571)	0.063 (0.631)	- 0.041 (0.757)
Social Consequences	- 0.102 (0.437)	0.049 (0.713)	- 0.177 (0.175)	0.078 (0.552)	0.010 (0.942)
Specific Symptoms	0.059 (0.657)	- 0.135 (0.303)	- 0.039 (0.770)	0.170 (0.194)	0.095 (0.473)
Attribution of Symptoms	- 0.049 (0.731)	- 0.009 (0.952)	- 0.120 (0.400)	0.102 (0.475)	- 0.163 (0.253)
PANSS G12	- 0.159 (0.225)	- 0.109 (0.405)	- 0.103 (0.432)	- 0.155 (0.237)	- 0.139 (0.301)

PANSS G12- insight score on PANSS insight item. r – Coefficient of correlation; p – Probability.

Age in years, number of years of education, age at onset of illness, duration of illness and number of admissions were not significantly correlated with score on any of the dimension of insight when measured using Pearson's correlation with a p value for significance fixed at 0.05.

Table 5b

Difference in Insight Score (PANSS G12) among subgroups of Categorical Social and Clinical Variables (t - Test)

Variable	Sub group (n)	Mean ± SD	t-value	p value
Sex	Female (30) Male (30)	4.67 ± 1.63 4.36 ± 1.45	0.75	0.454
Employment	Unemployed (34) Employed (26)	4.50 ± 1.52 4.53 ± 1.57	- 0.09	0.929
Region	Rural (36) Urban (24)	4.30 ± 1.51 4.83 ± 1.55	- 1.31	0.194
First episode	Yes (45) No (15)	4.56 ± 1.54 4.40 ± 1.54	0.34	0.737
Treatment	Typical (3) Atypical (57)	4.00 ± 1.73 4.54 ± 1.53	0.59	0.554
ECT	Given (12) Not given (48)	4.50 ± 1.24 4.52 ± 1.61	- 0.04	0.967

There was no significant difference in mean insight scores as measured by PANSS insight item between any of the sub groups of social and clinical variables. The variables examined were sex (male vs. female), employment (employed vs. unemployed), region (rural vs. urban), number of episodes (first episode vs. multiple), treatment administered (typical vs. atypical and ECT)

Table 5c

Difference in Insight Score (PANSS G12) between subgroups of Categorical Social and Clinical Variables (ANOVA)

Variable	Subgroup (N)	Mean ± SD	SE	f
Marital Status	Unmarried (29)	4.72 ± 1.43	0.26	0.431
	Married (26)	4.42 ± 1.52	0.29	
	Separated (5)	3.80 ± 2.16	0.96	
	Total (60)	4.51 ± 1.53	0.19	
Schizophrenia Type	Paranoid (38)	4.15 ± 1.58	0.25	0.034*
	Undifferentiated (12)	5.08 ± 1.16	0.33	
	Catatonic (1)	6.00 ± 0		
	Residual (3)	3.67 ± 1.52	0.88	
	Disorganized (6)	5.83 ± 0.75	0.30	
	Total (60)	4.51 ± 1.532	0.19	
Duration Untreated	< 1Month (8)	3.75 ± 0.70	0.25	0.624
	1 - 6 Month (10)	4.50 ± 1.35	0.42	
	6 - 12 Month (13)	4.84 ± 1.67	0.46	
	12 - 24 (Month (15)	4.53 ± 1.64	0.42	
	> 24 Month (14)	4.64 ± 1.78	0.47	
	Total (60)	4.51 ± 1.53	0.19	

* $p < 0.05$

A one way ANOVA analysis revealed that there was no significant differences between mean insight score (on PANSS G 12 item) and marital status and duration of untreated psychosis. The analysis indicated that there was a significant difference between different diagnostic subtypes of schizophrenia with regard to insight scores measured on PANSS. The highest mean insight was in residual schizophrenia and the lowest in undifferentiated and disorganized type.

Table 6a

Correlation between Insight Score in various domains of SUMD and Psychotic symptoms on SAPS (Pearson's Correlation) (n = 60)

Unawareness of	Correlation Coefficient (r)	p value	significance
Mental Illness	- 0.037	0.778	No
Effects of Treatment	- 0.126	0.335	No
Social Consequences	-0.053	0.689	No
Specific Symptoms	- 0.096	0.465	No
Attribution of Symptoms	- 0.024	0.867	No
PANSS G12	- 0.032	0.803	No

PANSS G12 - score on PANSS insight item; r - correlation coefficient; p – probability.

A correlation analysis revealed a small negative correlation between unawareness and severity of positive symptoms on SAPS. This was weak and not statistically significant.

Table 6b

Correlation between Insight Score in various domains of SUMD and Disorganization on SAPS (Pearson's Correlation)(n = 60)

Unawareness of	Correlation Coefficient (r)	p value	significance
Mental Illness	0.286	0.026	Yes
Effects of Treatment	0.160	0.222	No
Social Consequences	0.319	0.013	Yes
Specific Symptoms	0.408	0.001	Yes
Attribution of Symptoms	0.192	0.175	No
PANSS G12	0.263	0.043	Yes

PANSS G12- score on PANSS insight item; r - correlation coefficient; p – probability.

A correlation analysis revealed that there was a significant correlation between scores on disorganized dimension of SAPS and the unawareness of mental illness, average unawareness of symptoms of mental illness and unawareness of social consequences. However there was no significant correlation between disorganization and unawareness of treatment benefit and misattribution. A significant correlation as also noted with insight on PANSS insight item.

Table 6c

Correlation between Insight Score in various domains of SUMD and Negative symptoms on SANS (Pearson's Correlation)(n = 60)

Unawareness of	Correlation Coefficient (r)	p value	significance
Mental Illness	0.356	0.005	Yes
Effects of Treatment	0.350	0.222	No
Social Consequences	0.358	0.013	Yes
Specific Symptoms	0.441	0.001	Yes
Attribution of Symptoms	0.332	0.175	No
PANSS G12	0.366	0.040	Yes

PANSS G12- score on PANSS insight item; r - correlation coefficient; p – probability.

A correlation analysis revealed that there was a significant correlation between scores on severity of negative symptoms on SANS and the unawareness of mental illness, unawareness of symptoms of mental illness and unawareness of social consequences. However there was no significant correlation between negative symptoms and unawareness of treatment benefit and misattribution. A significant correlation as also noted with insight on PANSS insight item.

Table 6d

Correlation between Insight Score in various domains of SUMD and Depression-Anxiety of PANSS (Pearson's Correlation) (n = 60)

Unawareness of	Correlation Coefficient (r)	p value	significance
Mental Illness	- 0.596	0.000	Yes
Effects of Treatment	- 0.497	0.004	Yes
Social Consequences	- 0.472	0.000	Yes
Specific Symptoms	- 0.540	0.002	Yes
Attribution of Symptoms	- 0.389	0.005	Yes
PANSS G12	- 0.655	0.007	Yes

PANSS G12- score on PANSS insight item; r - correlation coefficient; p – probability.

A bivariate correlation analysis revealed that there was a negative correlation between unawareness scores on all domains of the SUMD and depression anxiety score on the PANSS. A similar significance was also found between the score of the insight item of PANSS and depression. The correlation was highly significant with p value less than 0.01. Thus patients who had a better insight were more depressed though no causal association can be made.

Table 7a

Correlation between Insight Score and WCST performance (Pearson's Correlation)

Unawareness of	Error		PR		NPE	
	r	p	r	p	r	p
Mental Illness	0.427**	0.009	0.426*	0.013	- 0.203	0.120
Effects of Treatment	0.390*	0.021	0.498*	0.027	- 0.314	0.105
Social Consequences	0.362**	0.004	0.394*	0.024	- 0.227	0.087
Specific Symptoms	0.417**	0.013	0.408*	0.042	- 0.135	0.304
Symptom Attribution	0.386*	0.028	0.356*	0.035	- 0.114	0.427
PANSS G12	0.450*	0.022	0.437**	0.009	- 0.224	0.086

* => $p < 0.05$; ** => $p < 0.01$; r – correlation coefficient; p – probability value;
Error = Percent Error; PR = Perseverative Resposes; NPE = Non Perseverative Errors

A bivariate correlation analysis revealed that there was a significant correlation between the scores on unawareness and percentage of total errors, perseverative responses. This indicated that poor insight correlated with poorer performance on WCST. There was no correlation between insight scores and number of non perseverative errors. A similar relation was noted between insight score on PANSS insight item and WCST scores.

Table 7b

Correlation between Insight Score and WCST performance (Pearson's Correlation) - continued

Unawareness of	PE		CLR		CC	
	r	p	r	p	r	p
Mental Illness	0.434*	0.011	- 0.483**	0.002	- 0.338*	0.013
Effects of Treatment	0.452**	0.003	- 0.445**	0.004	- 0.376*	0.020
Social Consequences	0.387*	0.041	- 0.425*	0.008	- 0.349**	0.006
Specific Symptoms	0.387*	0.010	- 0.508**	0.000	- 0.469**	0.000
Symptom Attribution	0.372*	0.042	- 0.410*	0.032	- 0.299*	0.033
PANSS G12	0.461*	0.000	- 0.495**	0.000	- 0.409**	0.001

* => $p < 0.05$; ** => $p < 0.01$; r – correlation coefficient; p – probability value; PE = Perseverative Errors; CLR = Conceptual Responses; CC = Categories Completed.

A bivariate correlational analysis revealed that there was a significant correlation between the scores on unawareness and number of perseverative errors. There was a negative correlation between unawareness and number of conceptual responses and categories completed. This indicated that better insight correlated with better performance on WCST. A similar relation was noted between insight score on PANSS insight item and WCST scores.

Table 8

Difference in Psychopathology and WCST scores between Poor And Good Insight groups on PANSS (G12). (t - Test)

Variable	Insight level (n)	Mean Score ± SD	SE	t	p
Depression	Good (17)	3.94 ± 1.67	0.40	6.02	0.001 **
	Poor (43)	1.79 ± 1.03	0.15		
Psychoticism	Good (17)	2.44 ± 0.96	0.23	- 0.09	0.928
	Poor (43)	2.46 ± 0.89	0.13		
Disorganization	Good (17)	1.74 ± 0.77	0.19	- 3.0	0.006 *
	Poor (43)	2.50 ± 0.92	0.14		
Negative	Good (17)	1.45 ± 0.59	0.14	- 3.08	0.003 *
	Poor (43)	2.25 ± 1.00	0.15		
% Errors	Good (17)	43.33 ± 10.48	2.54	- 3.01	0.004 *
	Poor (43)	53.44 ± 12.16	1.85		
Perseverative Response	Good (17)	45.12 ± 15.85	3.85	- 2.72	0.009 *
	Poor (43)	62.97 ± 25.08	3.82		
Perseverative error	Good (17)	32.82 ± 12.88	3.12	- 2.90	0.008 *
	Poor (43)	48.83 ± 21.23	3.23		
Conceptual Responses	Good (17)	50.00 ± 13.43	3.25	3.30	0.002 *
	Poor (43)	36.76 ± 14.01	2.13		
Categories completed	Good (17)	2.64 ± 1.11	0.27	3.32	0.002 **
	Poor (43)	1.65 ± 1.02	0.15		

* $p < 0.05$; ** $p < 0.01$; SD – Standard deviation; SE – Standard error; t – t value.

An alternate analysis by dividing the Sample into two groups based on scores on PANSS G12 item (score ≤ 3 = good insight; score ≥ 4 = poor insight) revealed that all variables found to be significant by correlation analysis continued to remain so.

Regression analysis

Regression analysis was done with each dimension of the insight and the PANSS insight item considered as the dependent variables. The perseverative error and categories completed were considered as WCST variables as they were most often found to be associated with insight deficits and are most often used as indices of WCST performance

Table 9a

Multiple Regression Analysis with Dependent Variable PANSS G12 for insight and including WCST Perseverative Errors

Variables Entered	B	SE	Beta	β	p
Constant	3.157	0.799		3.954	.000
1.Schizophrenia Type	0.128	0.151	0.109	0.847	.401
2.Depression	- 0.543	0.113	- 0.557	- 4.822	.023 *
3.Psychoticism	0.175	0.198	0.103	0.883	.381
4.Disorganization	- 0.239	0.207	- 0.146	- 1.155	.253
5.Negative Symptoms	0.315	0.212	0.199	1.489	.143
6.Perseverative Error	0.011	0.009	0.149	1.278	.207

* $p < 0.05$; B, SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.439$; $F = 8.697$; $Df = 6$
Dependent Variable: PANSS G12 Insight Item

When a multiple regression analysis was done including the significant items, and including the perseverative error as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 43.9 % of the insight score (adjusted $R^2 = 0.439$).

Table 9b

Multiple Regression Analysis with Dependent Variable PANSS G12 for insight and including WCST Categories completed

Variables Entered	B	SE	Beta	β	p
Constant	3.547	0.950		3.735	.000
1.Schizophrenia Type	0.133	0.153	0.114	0.864	.391
2.Depression	- 0.605	0.115	-0.620	-5.245	.000 **
3.Psychoticism	0.165	0.202	0.098	0.818	.417
4.Disorganization	- 0.220	0.214	-0.134	- 1.027	.309
5.Negative Symptoms	0.378	0.224	0.239	1.688	.097
6.Categories Completed	0.022	0.189	0.016	0.114	.909

** $p < 0.01$. B, SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.422$; $F = 8.177$; $Df = 6$
Dependent Variable: PANSS G12 Insight Item

When a multiple regression analysis was done including the significant items, and including the Categories Completed as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 42.2 % of the insight score (adjusted $R^2 = 0.422$)

Table 10a

Multiple Regression Analysis with Dependent Variable SUMD 1C for insight and including WCST Perseverative Errors

Variables Entered	B	SE	Beta	β	p
Constant	3.075	0.683		4.500	.000
1.Schizophrenia Type	0.306	0.129	0.315	1.372	.061
2.Depression	- 0.376	0.096	- 0.464	- 3.902	.000 **
3.Psychoticism	0.250	0.169	0.178	1.478	.145
4.Disorganization	- 0.126	0.177	- 0.092	- 0.711	.480
5.Negative Symptoms	0.138	0.181	0.105	0.763	.449
6.Perseverative Errors	0.009	0.007	0.140	1.165	.249

** $p < 0.01$. B, SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.406$; $F = 7.728$; $Df = 6$
Dependent Variable: SUMD 1C - Unawareness of Mental Illness

When a multiple regression analysis was done including the significant items, and including the perseverative error as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 40.6 % of the insight score (adjusted $R^2 = 0.406$).

Table 10b

Multiple Regression Analysis with Dependent Variable SUMD 1C for insight and including WCST Categories completed

Variables Entered	B	SE	Beta	β	p
Constant	2.943	0.804		3.659	.001
1.Schizophrenia Type	0.318	0.130	0.328	1.449	.058
2.Depression	- 0.457	0.098	- 0.564	- 4.685	.001 **
3.Psychoticism	0.259	0.171	0.184	1.515	.136
4.Disorganization	- 0.080	0.181	- 0.059	- 0.444	.659
5.Negative Symptoms	0.240	0.189	0.182	1.268	.211
6.Categories Completed	0.151	0.160	0.134	0.943	.350

** $p < 0.01$; SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.401$; $F = 7.758$; $Df = 6$
Dependent Variable: SUMD 1C - Unawareness of Mental Illness

A multiple regression analysis was done including the significant items, and including the Categories Completed as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 40.10 % of the insight score (adjusted $R^2 = 0.401$).

Table 11a

Multiple Regression Analysis with Dependent Variable SUMD 2C for insight and including WCST Perseverative Errors

Variables Entered	B	SE	Beta	β	p
Constant	3.154	0.777		4.058	.000
1.Schizophrenia Type	0.186	0.147	0.182	1.270	.210
2.Depression	- 0.319	0.110	- 0.373	- 2.909	.005**
3.Psychoticism	0.083	0.193	0.056	0.430	.669
4.Disorganization	- 0.330	0.201	- 0.230	- 1.642	.106
5.Negative Symptoms	0.287	0.206	0.207	1.393	.170
6.Perseverative Errors	0.015	0.009	0.228	1.761	.084

** $p < 0.01$; SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.309$; F = 5.387; Df = 6
Dependent Variable: SUMD 2C - Unawareness of achieved effects of Medication

A multiple regression analysis was done with the dependent variable as SUMD Unawareness of Medication Effects and entering the significant items, including the Perseverative errors score as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 30.9 % of the insight score (adjusted $R^2 = 0.309$).

Table 11b

Multiple Regression Analysis with Dependent Variable SUMD 2C for insight and including WCST Categories completed

Variables Entered	B	SE	Beta	β	p
Constant	4.102	0.934		4.389	.000
1.Schizophrenia Type	0.185	0.151	0.181	1.224	.226
2.Depression	- 0.369	0.113	- 0.432	- 3.255	.002**
3.Psychoticism	0.055	0.199	0.037	0.275	.785
4.Disorganization	- 0.335	0.210	- 0.233	- 1.590	.118
5.Negative Symptoms	0.319	0.220	0.230	1.450	.153
6.Categories Completed	- 0.101	0.186	- 0.085	- 0.545	.588

** $p < 0.01$; SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.272$; $F = 4.676$; $Df = 6$
Dependent Variable: SUMD 2C - Unawareness of achieved effects of Medication

A multiple regression analysis was done with the dependent variable as SUMD Unawareness of Medication Effects and entering the significant items, including the Categories Completed score as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 27.2 % of the insight score (adjusted $R^2 = 0.272$).

Table 12a

Multiple Regression Analysis with Dependent Variable SUMD 3C for insight and including WCST Perseverative Errors

Variables Entered	B	SE	Beta	β	p
Constant	3.410	0.698		4.882	.000
1.Schizophrenia Type	0.081	0.132	0.093	0.612	.543
2.Depression	- 0.236	0.099	- .327	- 2.392	.020 *
3.Psychoticism	0.068	0.173	0.055	0.396	.694
4.Disorganization	0.036	0.181	0.030	0.199	.843
5.Negative Symptoms	0.185	0.185	0.158	0.999	.323
6.Perseverative Errors	0.008	0.008	0.141	1.024	.311

* $p < 0.05$; SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.217$; $F = 3.729$; $Df = 6$
Dependent Variable: SUMD 3C - Unawareness of Social Consequences

A multiple regression analysis was done with the dependent variable as SUMD Unawareness of Social Consequences and entering the significant items, including the Perseverative Errors score as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 21.7 % of the insight score (adjusted $R^2 = 0.217$).

Table 12b

Multiple Regression Analysis with Dependent Variable SUMD 3C for insight and including WCST Categories completed

Variables Entered	B	SE	Beta	β	p
Constant	3.671	0.826		4.444	.000
1.Schizophrenia Type	0.084	0.133	0.098	0.632	.530
2.Depression	- 0.280	0.100	- 0.387	- 2.788	.007**
3.Psychoticism	0.062	0.176	0.050	0.354	.725
4.Disorganization	0.050	0.186	0.041	0.269	.789
5.Negative Symptoms	0.230	0.195	0.196	1.182	.243
6.Categories Completed	0.019	0.164	0.019	0.113	.910

** $p < 0.01$; SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.202$; $F = 3.488$; $Df = 6$

Dependent Variable: SUMD 3C - Unawareness of Social Consequences

A multiple regression analysis was done with the dependent variable as SUMD Unawareness of Social Consequences and entering the significant items, including the Categories Completed score as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 20.2 % of the insight score (adjusted $R^2 = 0.202$).

Table 13a

Multiple Regression Analysis with Dependent Variable SUMD Awareness Score and including WCST Perseverative Errors

Variables Entered	B	SE	Beta	β	p
Constant	3.521	0.521		6.760	.000
1. Schizophrenia Type	0.035	0.098	0.051	0.357	.723
2. Depression	- 0.230	0.073	- 0.397	- 3.128	.003**
3. Psychoticism	- 0.006	0.129	- 0.006	- 0.045	.965
4. Disorganization	0.095	0.135	0.098	0.704	.484
5. Negative Symptoms	0.207	0.138	0.220	1.496	.141
6. Perseverative Errors	0.003	0.006	0.064	0.499	.620

** $p < 0.01$; SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.323$; $F = 5.698$; $Df = 6$

Dependent Variable: SUMD Average Unawareness of Symptom Score

A multiple regression analysis was done with the dependent variable as SUMD Average Unawareness score of symptoms and entering the significant items, including the Perseverative Errors score as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 32.3 % of the insight score (adjusted $R^2 = 0.323$).

Table 13b

Multiple Regression Analysis with Dependent Variable SUMD Awareness Score and including WCST Categories Completed

Variables Entered	B	SE	Beta	β	p
Constant	4.261	0.605		7.044	.000
1. Schizophrenia Type	0.022	0.097	0.032	0.226	.822
2. Depression	- 0.200	0.072	- 0.346	- 2.781	.007 **
3. Psychoticism	- 0.015	0.126	- 0.015	- 0.122	.904
4. Disorganization	0.081	0.132	0.083	0.610	.544
5. Negative Symptoms	0.168	0.137	0.179	1.229	.224
6. Categories Completed	- 0.013	0.008	- 0.207	- 1.564	.124

** $p < 0.01$; SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.324$; $F = 5.720$; $Df = 6$

Dependent Variable: SUMD Average Unawareness of Symptom Score

A multiple regression analysis was done with the dependent variable as SUMD Average Unawareness score of symptoms and entering the significant items, including the Categories Completed score as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 32.4 % of the insight score (adjusted $R^2 = 0.324$).

Table 14a

Multiple Regression Analysis with Dependent Variable SUMD Attribution Score and including WCST Perseverative Errors

Variables Entered	B	SE	Beta	β	p
Constant	3.685	0.670		5.505	.000
1. Schizophrenia Type	- 0.051	0.125	- 0.062	- 0.406	.687
2. Depression	- 0.173	0.093	- 0.284	-1.869	.048
3. Psychoticism	- 0.071	0.169	- 0.060	- 0.418	.678
4. Disorganization	- 0.155	0.174	- 0.155	- 0.892	.377
5. Negative Symptoms	0.339	0.193	0.298	1.757	.086
6. Perseverative Errors	0.012	0.008	0.223	1.482	.145

* $p < 0.05$; SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.156$; $F = 2.540$; $Df = 6$
Dependent Variable: SUMD Average Attribution Score

When a multiple regression analysis was done with the dependent variable as SUMD Average Attribution score of symptoms and entering the significant items, including the Categories Completed score as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 15.6 % of the insight score (adjusted R^2= 0.156).

Table 14b

Multiple Regression Analysis with Dependent Variable SUMD Attribution Score and including WCST Categories Completed

Variables Entered	B	SE	Beta	β	p
Constant	4.418	0.848		5.211	.000
1. Schizophrenia Type	- 0.050	0.128	- 0.060	- 0.387	.701
2. Depression	- 0.205	0.094	- 0.335	- 2.166	.036*
3. Psychoticism	- 0.079	0.175	- 0.068	- 0.451	.654
4. Disorganization	- 0.149	0.184	- 0.149	- 0.810	.422
5. Negative Symptoms	0.344	0.202	0.303	1.702	.096
6. Categories Completed	- 0.083	0.166	- 0.091	- 0.503	.617

* $p < 0.05$; SE (std. error) – unstandardized coefficients; β – Standardized coefficient. p – probability.

Adjusted $R^2 = 0.119$; $F = 2.125$; $Df = 6$

Dependent Variable: SUMD Average Attribution Score

. When a multiple regression analysis was done with the dependent variable as SUMD Average Attribution score of symptoms and entering the significant items, including the Categories Completed score as a WCST variable, it was found that only depression continued to be significant. All the variables entered could account for 11.9 % of the insight score (adjusted $R^2 = 0.119$).

DISCUSSION

Demographic Factors

The mean age of the sample was 29.3 years. The relatively young age of the sample was due to the selection criteria which imposed an upper age limit of 40 years. The average number of years spent in school was 8.8 years. This is also partially due to the younger age of the sample (more people attend formal education currently); however it might also be due to the predominant urban nature of the sample as well.

There was no relationship demonstrable between age, sex, years of education, marital status, employment, religion, region and income and the scores on the insight scales. This is in line with most of other studies which also do not report any correlation between insight and socio demographic factors.

Insight

The mean scores on insight ranged between 3.55 and 4.12 for various insight dimensions. This is in accordance with the general view that schizophrenic patients have a poor insight into their illness. The average scores for unawareness of social consequences and attribution was lesser than the other domains.

The level of insight was lower than many of the reported studies (Young et al, 1993; Keshavan et al, 2004). This implies a relatively higher degree of unawareness among patients in the sample. This might also reflect cultural differences as well in the assessment of insight as has been suggested by Saravanan et al, (2007) and Johnson and Orrell, (1995).

Since a majority of the sample had an insight rating of severe unawareness, all statistical analyses were done considering the sample as a single group.

There was a significant difference between scores on different insight domains (the coefficient of concordance – Kendall's W = 0.099; χ^2 = 17.83; asymp. Sig = 0.000). However there was a significant correlation noted between all insight scores. This seems to indicate both the mutual relationship and the independence of different insight domains. Thus while a person with faulty attribution of illness need not be similarly impaired in awareness, he is more likely to be so.

Insight and Clinical Factors

The mean duration of the illness (4.17 yrs) and number of admissions (1.75) were lesser than other similar studies in this area like Freudenreich et al, (2004) and Dickerson et al, (1997). This could also be a reflection of the selection criteria adopted.

The lack of association between insight and duration of illness and number of admissions is contrary to findings by Drake et al, (2000), However, Amador et al, (1994) and Mintz et al, (2003) give the same fingings. The

results are also explainable by the relatively young age of the sample which could influence such an association.

Handedness and insight association could not be assessed as the entire sample was right handed.

The majority of patients (63.33) had a diagnosis of paranoid schizophrenia. The proportion of the sample with a diagnosis of residual schizophrenia was small (5 %). This was because the study was done on inpatients that were more likely to have active symptomatology.

The nature of the episode and the treatment also did not influence insight. However the small number of patients receiving typical anti psychotics (5%) makes any meaningful comparison impossible. There was no difference between the ECT and Non ECT groups either in insight score or WCST performance (SE 7.73; t – 1.33; sig- 0.188). This might be due either to the small sample or the use of a single cognitive test. However, Lorena et al, (2004) have reported that there is no additional cognitive impairment with ECT treatment in schizophrenia.

There was a significant difference in the mean insight scores between different types of schizophrenia when measuring with the PANSS insight item. Lower insight was seen in disorganized and the undifferentiated type of illness. The number of patients in these groups was less and this association was lost in the multiple regression analysis when other factors were added. Effect of the type of schizophrenia on insight might be also be mediated through differences in other factors like greater severity of psychosis and cognitive deficits. Laroi

et al, (2000) also reported that undifferentiated sub type was correlated with greater unawareness.

Insight and Psychopathology

The mean score on psychopathology scores ranged between 2.46 for positive symptoms and 2.03 for negative symptoms. This was comparable to other reported studies which had used a post acute sample (Smith et al, 200o; Cuesta et al, 1995).

Though some authors (Kemp and Lambert, 1995; Amador et al, 1993; Mintz et al, 2003) have noted an association between insight scores and psychotic symptoms, we did not find any significant correlation. This finding is in line with the findings of Cuesta and Peralta in 1994a. One explanation for the finding could be the contention that insight is not state dependent in schizophrenia and is a stable marker of the diagnosis.

Disorganized symptom dimension in SAPS and PANSS have been associated more frequently than positive symptoms with insight. While this study also suggested an association between disorganization and unawareness, this was lost on regression analysis.

The initial analysis revealed a strong relation between severity of negative symptoms and all dimensions of insight. This was lost on subsequent regression analysis. This negative result is similar to the findings of other studies by Amador et al, (1994) and Cuesta and Peralta (1994a). However it could also be due to the significant confounding by other variables which had been measured.

Insight and Depression

There was a very significant inverse correlation between insight and average scores on the PANSS depression-anxiety domain. After regression analysis, depression was the only variable which was significantly associated with insight. This study thus strengthens the finding that depression is an outcome of good insight and that lack of insight could be a defense mechanism in schizophrenia.

WCST and Insight

The scores on the WCST were much lower than reported in similar studies in western countries (Keshavan et al, 2005; Smith et al, 2000). The poor performance of the sample on the WCST could be explained by two factors: a) the post acute nature of the sample and b) it has been demonstrated that the WCST performance is poorer in Indian population presumably due to the nature of education (Kohli and Kaur, 2006).

The Conceptual Level Responses (CLR) and Categories Completed (CC) scores on WCST which are indicators of good performance were both significantly correlated with better insight but the relation was lost on regression analysis. Similarly, the total error, perseverative responses and perseverative errors which are indicators of poor executive function and set shifting also did not maintain their association during regression analysis. One reason for the negative result could be due to the relatively small sample size which could have been unable to tease out small differences. Adding to this could be other factors like the relative homogeneity of the sample both with regard to insight and WCST performance. However it must be remembered that

many studies have failed to turn up a significant association between insight and cognition as well. There was no difference among different domains of insight in this regard.

The adjusted R^2 on multiple regressions varied between 0.119 and 0.401 indicating that approximately 10 to 40 % of the insight score could be accounted for by the factors entered. This is in line with previous studies by Keshavan et al, (2004) and McCabe et al, (2002), who found that regression models predicted 30% and 23% of the variance in insight.

CONCLUSIONS

1. Poor insight is widely prevalent in schizophrenia

2. There was no association between socio demographic variables and insight.

3. There was no association between severity of psychopathology and insight.

4. There was a significant relationship between insight and depression anxiety domain of PANSS which was maintained even after correcting for other variables.

5. There was no association between executive function and insight

6. All the variables assessed could only account for 10 to 40 percent of variance in insight score.

LIMITATIONS

This study has a number of limitations some of which are ubiquitous in studies done on this topic. The study was done on a sample of admitted schizophrenia patients. This makes the results of the study less generalizable to the overall population of schizophrenia patients.

The sample size of 60 was relatively small to detect fine associations especially in the presence of multiple confounding variables.

The cross sectional nature of the study makes it possible that the conclusions made may be unstable, or that they may be reflective of a phenomenon particular to one phase of illness.

The proportion of the sample with good insight was low, hence reducing the chance of detecting any differences between groups.

All ratings were done by the investigator only hence introducing the risk of an interviewer bias.

The cross cultural validity of the SUMD is not established.

Only a single cognitive test was used (WCST). The study did not measure general cognitive function or other specific aspects of cognitive function like memory. Though this approach is used frequently (Cuesta et al, 1995, Collins et al, 1997 and Lysaker et al, 2003), an assessment of general

cognitive functions would have given the ability to understand the relationship between insight and other aspects of cognitive function.

The study did not include premorbid function which has been studied by others (Keshavan et al, 2004)

The study was naturalistic with regard to treatment and influence of treatment variables could not be clearly assessed.

STRENGTHS

To our knowledge this is the first study in the Indian context about insight which tries to include the influence of cognitive factors.

The sample was relatively homogenous for age and education and had an equal number of both male and females, thus reducing the risk of confounding. This is significant considering the difference in WCST performance with age and education and the absence of any standard scores for the Indian population and in schizophrenia.

The sample had a relatively short duration of illness, thus minimizing the influence of illness chronicity on patient function.

The study utilized the SUMD to measure insight which is a multi dimensional scale and reported to be sensitive in measuring the fine differences in insight in different domains.

FUTURE DIRECTIONS

The development of indigenous insight scales to measure insight domains especially awareness of negative symptoms and attribution is required.

Future studies should use a technique of comparing low and high insight groups so as to bring to light any small associations.

Future studies should focus on not just performance on cognitive tests but also on the meta-cognitive processes which underlie thinking and insight.

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ANNEXURE I

SOCIO DEMOGRAPHIC DATA SHEET

Serial No: _____ **OP. No:** _____

Name: _____ **Age:** _____ **Sex:** **Male** ☐ **Female** ☐

Marital status: **Unmarried** ☐ **Married** ☐ **Separated** ☐

Religion: **Hindu** ☐ **Christian** ☐ **Muslim** ☐ **Other** ☐

Education in Years: _____ **Employment:** **Yes** ☐ **No** ☐

Nature of Work: **Manual** ☐ **Unskilled** ☐ **Skilled** ☐

Residence: **Urban** ☐ **Rural** ☐

Income Class: **> 900** ☐ **900 - 3000** ☐ **3001 - 9999** ☐ **> 10,000** ☐

CLINICAL DATA SHEET

Type of Schizophrenia: **Paranoid** ☐ **Undifferentiated** ☐ **Catatonic** ☐
Residual ☐ **Disorganized** ☐ **Other** ☐

First Episode: **Yes** ☐ **No** ☐ **Age at Onset:** _____

Duration Untreated: _____ **Age at First Hospitalisation:** _____

Number of Admissions: _____ **Duration of Illness:** _____

Family History: **Yes** ☐ **No** ☐ **Handedness:** **Right** ☐ **Left** ☐

Current Treatment: **Typicals** ☐ **Atypicals** ☐ **Current ECT:** **Yes** ☐ **No** ☐

Current Substance Use: **Yes** ☐ **No** ☐

ANNEXURE II

Positive and Negative Syndrome Scale (PANSS)

G 12: Lack of Judgment and Insight

Impaired awareness or understanding of one's own psychiatric condition and life situation; failure to recognize past or present psychiatric illness or symptoms; denial of need for psychiatric hospitalization or treatment, unrealistic short term and long range planning; decisions characterized by poor anticipation of consequences. Basis: thought cont expressed during the interview ☐

Depression Anxiety Domain

G 2: Anxiety

Subjective experience of nervousness, worry, apprehension or restlessness, ranging from excessive concern about the present or future to feelings of panic. Basis verbal report during the interview and physical manifestations. ☐

G 3: Guilt Feelings

Sense of remorse or self blame for real or imagined misdeeds in the past. Basis: verbal report during the interview and influence on attitudes in the thoughts. ☐

G 4: Tension

Overt physical manifestations of fear, anxiety, agitation such as stiffness, tremor, profuse sweating and restlessness. Basis: verbal report attesting to to anxiety and the severity of physical manifestations during interview**.** ☐

G 6: Depression

Feelings of sadness, discouragement, helplessness and pessimism. Basis: verbal report of depressed mood and its observed influence on attitude and behavior. ☐

1 = absent; 2 = minimal; 3 = mild; 4 = moderate; 5 = moderately severe
6 = severe; 7 = extreme

Average Depression - Anxiety Score: ☐

ANNEXURE III

Scale for Assessment of Positive Symptoms (SAPS)

Hallucinations

1) Auditory Hallucinations:	0☐	1☐	2☐	3☐	4☐	5☐
2) Voices Commenting:	0☐	1☐	2☐	3☐	4☐	5☐
3) Voices Conversing:	0☐	1☐	2☐	3☐	4☐	5☐
4) Somatic or Tactile Hallucinations:	0☐	1☐	2☐	3☐	4☐	5☐
5) Olfactory Hallucinations:	0☐	1☐	2☐	3☐	4☐	5☐
6) Visual Hallucinations:	0☐	1☐	2☐	3☐	4☐	5☐
7) Global Rating of Hallucinations:	0☐	1☐	2☐	3☐	4☐	5☐

Delusions

8) Persecutory Delusions:	0☐	1☐	2☐	3☐	4☐	5☐
9) Delusions of jealousy:	0☐	1☐	2☐	3☐	4☐	5☐
10) Delusions of Guilt or Sin:	0☐	1☐	2☐	3☐	4☐	5☐
11) Grandiose Delusions:	0☐	1☐	2☐	3☐	4☐	5☐
12) Religious Delusions:	0☐	1☐	2☐	3☐	4☐	5☐
13) Somatic Delusions:	0☐	1☐	2☐	3☐	4☐	5☐
14) Delusions of Reference:	0☐	1☐	2☐	3☐	4☐	5☐
15) Delusions of Being Controlled:	0☐	1☐	2☐	3☐	4☐	5☐
16) Delusions of Mind Reading:	0☐	1☐	2☐	3☐	4☐	5☐
17) Thought Broadcast:	0☐	1☐	2☐	3☐	4☐	5☐
18) Thought Insertion:	0☐	1☐	2☐	3☐	4☐	5☐
19) Thought Withdrawal:	0☐	1☐	2☐	3☐	4☐	5☐
20) Global Rating of Delusions:	0☐	1☐	2☐	3☐	4☐	5☐

Bizarre Behavior

21) Clothing and Appearance:	0☐	1☐	2☐	3☐	4☐	5☐
22) Social and Sexual Behavior:	0☐	1☐	2☐	3☐	4☐	5☐
23) Aggressive and Agitated Behavior:	0☐	1☐	2☐	3☐	4☐	5☐
24) Repetitive or Stereotyped Behavior:	0☐	1☐	2☐	3☐	4☐	5☐
25) Global Rating of Bizarre Behavior:	0☐	1☐	2☐	3☐	4☐	5☐

Positive Formal Thought Disorder

26) Derailment:	0☐	1☐	2☐	3☐	4☐	5☐
27) Tangentiality:	0☐	1☐	2☐	3☐	4☐	5☐
28) Incoherence:	0☐	1☐	2☐	3☐	4☐	5☐
29) Illogicality:	0☐	1☐	2☐	3☐	4☐	5☐
30) Circumstantiality:	0☐	1☐	2☐	3☐	4☐	5☐
31) Pressure of Speech:	0☐	1☐	2☐	3☐	4☐	5☐
32) Distractible Speech:	0☐	1☐	2☐	3☐	4☐	5☐
33) Clanging:	0☐	1☐	2☐	3☐	4☐	5☐
34) Global Rating of Formal Thought Disorder:	0☐	1☐	2☐	3☐	4☐	5☐

Inappropriate Affect

35) Inappropriate Affect:	0☐	1☐	2☐	3☐	4☐	5☐

Average Psychoticism Score : _____

Average Disorganization Score: _____

0 = None; 1 = Questionable; 2 = Mild; 3 = Moderate; 4 = Marked; 5 = Severe

ANNEXURE IV

Scale for Assessment of Negative Symptoms (SANS)

Affective Flattening or Blunting

1) Unchanging Facial Expression:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
2) Decreased Spontaneous Movements:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
3) Paucity of Expressive Gestures:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
4) Poor Eye Contact:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
5) Affective Non-responsivity:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
6) Lack of Vocal Inflections:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
7) Global Rating of Affective Flattening:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐

Alogia

8) Poverty of Speech:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
9) Poverty of Content of Thought:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
10) Blocking:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
11) Increased Latency of Response:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
12) Global Rating of Alogia:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐

Avolition – Apathy

13) Grooming and Hygiene:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
14) Impersistence at Work or School:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
15) Physical Anergia:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
16) Global Rating of Avolition – Apathy:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐

Anhedonia – Asociality

17) Recreational Interests and Activities:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
18) Sexual Activity:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
19) Ability to Feel Intimacy and Closeness:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
20) Relationships with Friends and Peers:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
21) Global rating of Anhedonia – Asociality:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐

Attention

22) Social Inattentiveness:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
23) Inattentiveness during Mental Testing:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
24) Global Rating of Attention:	0☐ 1☐ 2☐ 3☐ 4☐ 5☐

TOTAL NEGATIVE SYMPTOM SCORE: _____

0 = None; 1 = Questionable; 2 = Mild; 3 = Moderate; 4 = Marked; 5 = Severe

ANNEXURE V

Scale for assessment of Unawareness of Mental Disorders (SUMD)

1) Awareness of Mental Disorder

C: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

2) Awareness of Achieved Effects of Medication

C: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

3) Awareness of Social Consequences of Mental Disorder

C: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

4) Hallucinations

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

5) Delusions

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

6) Thought Disorder

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

7) Inappropriate Affect

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

8) Unusual Dress or Appearance

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

9) Stereotypic or Ritualistic Behavior

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

10) Poor Social Judgment

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

11) Poor Control of Aggressive Impulses

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

12) Poor Control of Sexual Impulses

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

13) Alogia

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

14) Flat or Blunted Affect

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

15) Avolition – Apathy

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

16) Anhedonia – Asociality

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

17) Poor Attention

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

18) Confusion – Disorientation

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

19) Unusual Eye Contact

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

20) Poor Social Relationships

Aw: 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

At : 0) ☐ 1) ☐ 2) ☐ 3) ☐ 4) ☐ 5) ☐

Average Awareness Score (Average of items scored in 4 – 20): _____

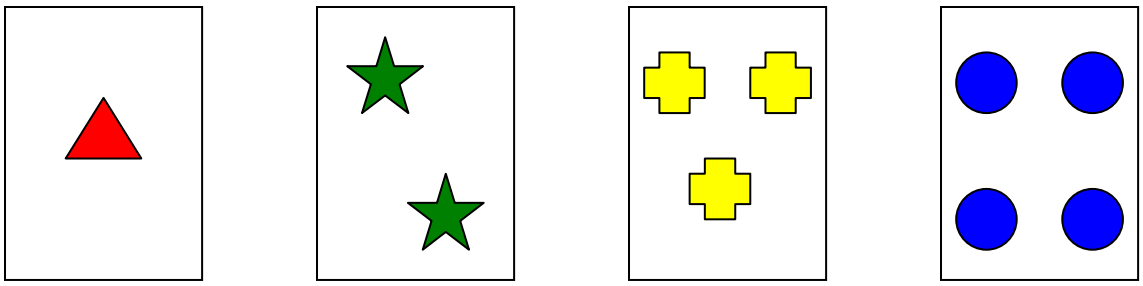
Average Attribution Score (Average of items scored in 4 – 20): _____

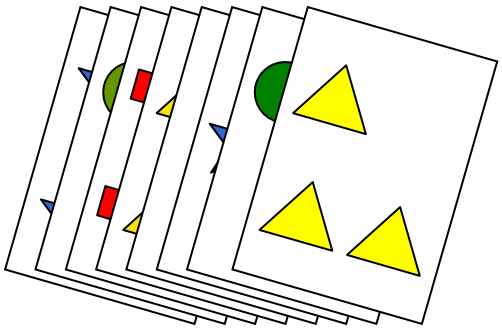
0 = Cannot be assessed; **1** = Clearly believes; **3** = Unsure but can entertain the idea; **5** = Complete Denies the possibility.

C – Current; **Aw** – Awareness; **At** – Attribution.

ANNEXURE VI

Wisconsin Card Sorting Test (WCST)





"Please sort the 60 cards under the 4 samples. I won't tell you the rule, but I will announce every mistake."